Advantech Energy Solutions

Advantech iCDManager SDK User Manual

SDK & API Help document

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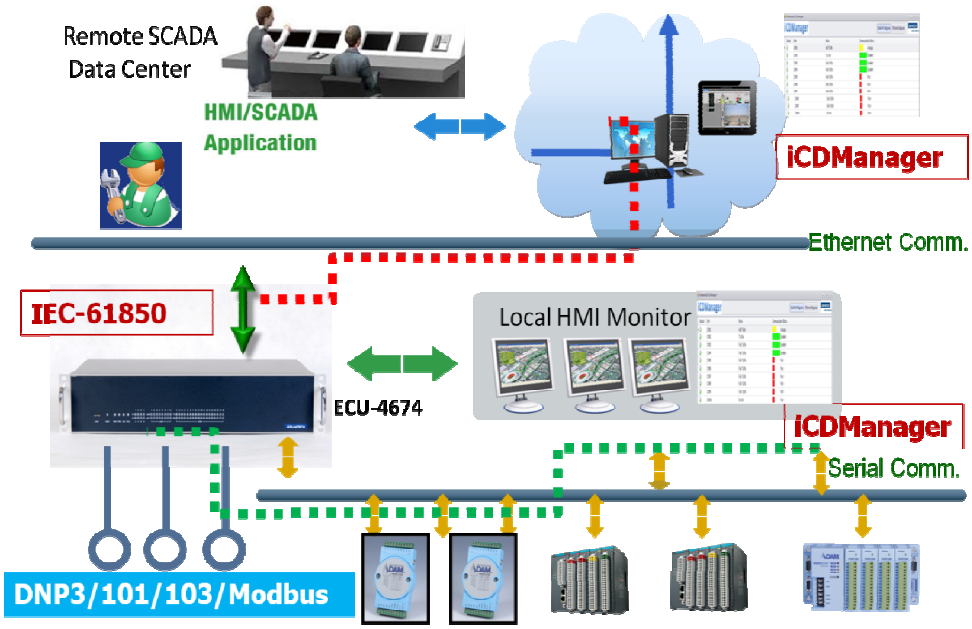
1. iCDManager (intelligent Connectivity Diagnose Manager) Overview

As you know, the substation communication gateway play the important roles, which communicate with the more intelligent device in the smart substation , Suppose the remote SCADA operator find that there are some communication issue with the substation gateway , which may occurred in the remotely substation , because the substation is located in the remote suburb usually , the service engineer will take the long time to get to the substation and maintain the communication issue， it will cause the high maintain cost and low efficiency。

How to help the remote SCADA operator to diagnose the communication heath issue and analyze the root cause of the communication issue ?

Advantech iCDManager will provide the intelligent connectivity diagnose solution for this requirement, the remote SCADA operator can monitor the substation gateway‘s communication health and guide the substation field operator to examine the physical communication link or the other software application configuration by the iCDManager service .

Advantech iCDManager is the intelligent Connectivity Diagnose Manager tools, which can monitor and diagnose the Power & Energy computers ‘s communication status, this tools can report the communication quality and failure for the network communication issue , it can improve diagnose efficiency and save the maintain cost in the complicated network application.



1.1 the system Structure diagram

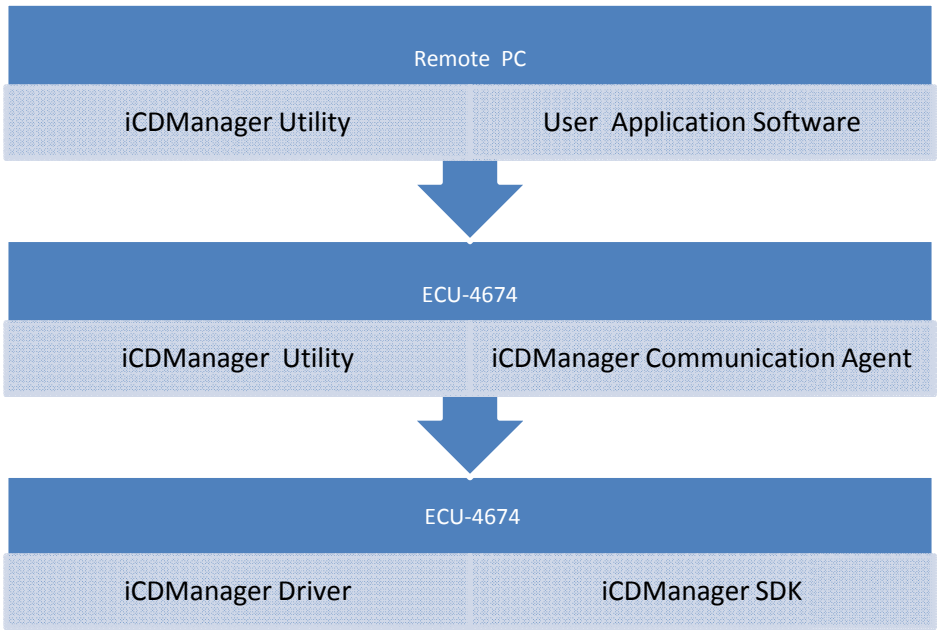


Figure 1 : iCDManager software structure diagram

Figure 1 illustrate the iCDManager's system structure and component :

（1）iCDManager SDK

The iCDManager SDK module will provide the iCDManager driver and Program API for the customer application for ECU-4674 .

（2）iCDManager Communication Agent

The communication Agent will run in the Power & Energy computers (ECU -4674 Series) , which can communicate with the remote PC 's iCDManager Application software , this Agent will transfer the communication port status to the iCDManager application software according to the iCDManager's configuration requirement . iCDManager Utility communicate with the communication Agent by TCP/IP with ECU-4674 , ECU Listening TCP Port is 7000， the Protocol format is defined by Advantech. it can connect the more Power & Energy computers and monitor the multi ECU Device 's communication status.

（3）iCDManager Utility

iCDManager Utility will run in the Local ECU-4674 , it can connect the more Power & Energy computers and monitor the multi ECU Device 's communication status.

（4）iCDManager Application Software

iCDManager Application Software will run in the Remote SCADA PC , which can communicate with the remote ECU-4674 's iCDManager Agent , it can connect the more Power & Energy computers and monitor the multi ECU Device 's communication status by communication with iCDManager Agent 's communication protocol。

User can configure the different communication mode and iCDManager will rate

the communication quality according to the communication data transferring content .

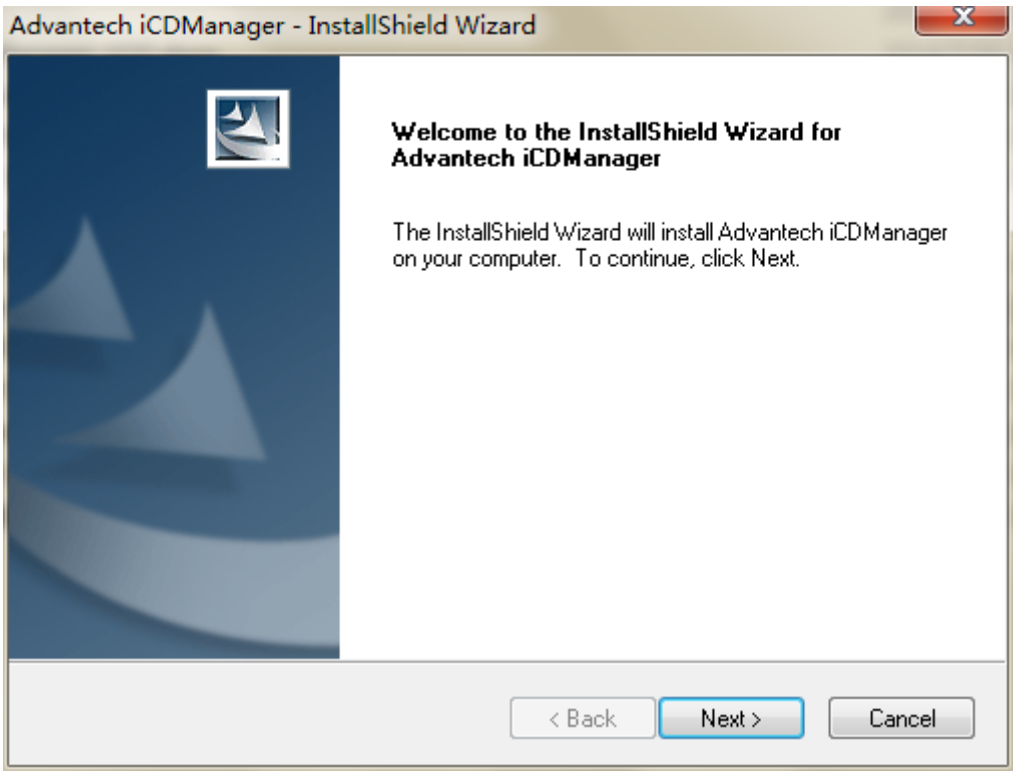
1.2 iCDManager driver & SDK Installation

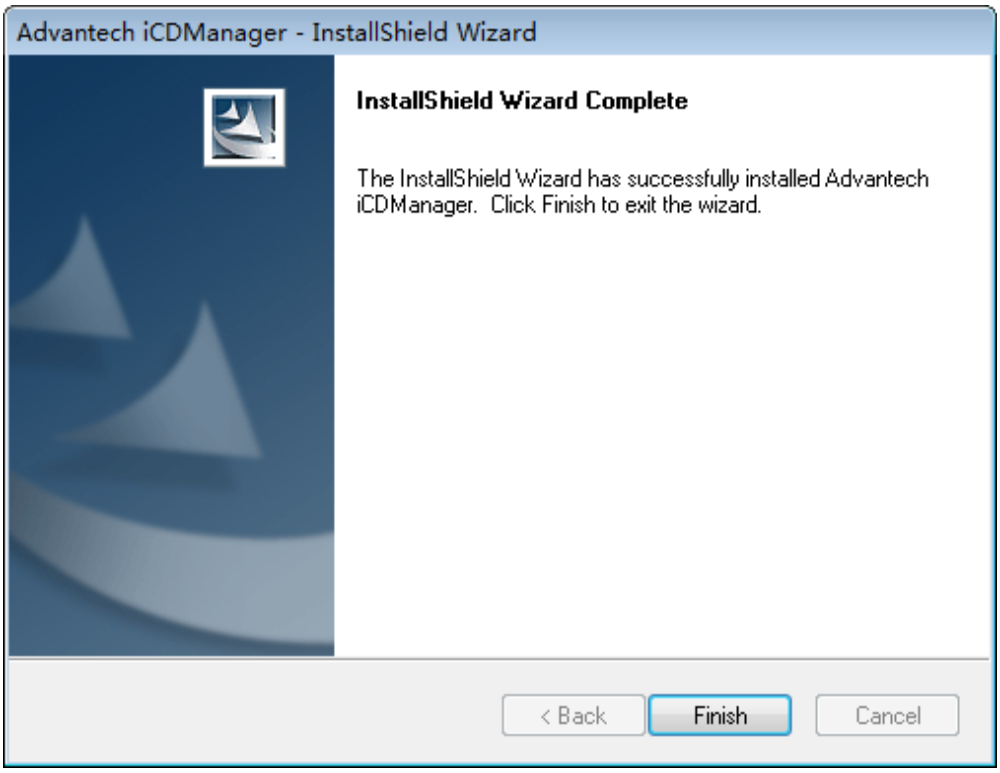
Installation is required. If there is no existing installation of Advantech iCDManager SDK on your computer, take the following steps to install Advantech iCDManager SDK.

How to install Advantech iCDManager SDK

Verify that your computer meets the hardware and software requirements to run Advantech iCDManager SDK. If you do not already have a copy of the installer Advantech iCDManager driver, pls. download the installer. You can run iCDManager.exe, This will install driver and SDK of iCDManager

SUSI Setup
Welcome to the SUSI Setup Wizard
The Setup Wizard will allow you to change the way SUSI features are installed on your computer or even to remove SUSI from your computer. Click "Next" to continue or "Cancel" to exit the Setup Wizard.
< Back
Next >
Cancel


Advantech iCDManager - InstallShield Wizard
Welcome to the InstallShield Wizard for Advantech iCDManager
The InstallShield Wizard will install Advantech iCDManager on your computer. To continue, click Next.
< Back
Next >
Cancel


Advantech iCDManager - InstallShield Wizard
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed Advantech iCDManager. Click Finish to exit the wizard.
< Back
Finish
Cancel

After install the iCDManager driver , you can run the iCDManager utility to monitor the Power & Energy computers 's communication status in the ECU-4674 Local terminal .

2 Software Application

2.1 SDK

2.1.1 API Function Description

2.1.1.1 IcdmGetSerialPortCount

IcdmGetSerialPortCount
statement ：
uint IcdmGetSerialPortCount();
function ：
Get the ECU serial port number
parameter ： Null
Return Value：
Serial port count of ECU。

2.1.1.2 IdcmGetSerialCommStatus

IdcmGetSerialCommStatus
Statement ：
bool IdcmGetSerialCommStatus(
uint portNumber,
CommDataType commDataType);
Function：
Get the serial communication status from the ECU
Parameter ：
Port Number： serial port number , for example : 1 is for COM1。
Comm. Data Type：communication data type ， 0 is sending data，1 is receiving data.
Return value ：
If data communication return true； else return false。

2.1.1.3 IcdmGetSerialCommExceptionTime

Statement ：
uint IcdmGetSerialCommExceptionTime(
uint portNumber,
CommDataType commDataType);
Function ： Get the ECU serial port abnormal communication status。
Parameter ：
Port number ： serial port number， for example: 1 is COM1。

Comm. Data Type：communication data type ，0 is for sending data , 1 is for receiving data。

Return value ： the serial communication abnormal status (ms)

2.1.1.4 IcdmGetSerialCommDataInterval

Statement ：

uint IcdmGetSerialCommDataInterval(uint portNumber);

Function ：

Get the sending and receiving time interval of the ECU serial communication

Parameter ：

Port Number：serial port number , for example : 1 is for COM1。

Return Value : the sending and receiving time interval for the serial port

2.1.1.5 IcdmGetSerialInfo

Statement：

bool IcdmGetSerialInfo(uint32 portNumber, uint32& RxElapsed, uint32& TxElapsed, uint32& ResponseTime);

Function：Get the sending and receiving , response time interval 。

Parameter：

port Number：serial port number，for example :1 is for COM1。

RxElapsed：receiving time interval (ms)

TxElapsed：sending time interval (ms)

ResponseTime：response time interval(ms)

Return value ： return true when success, return false when failure

2.1.1.6 IcdmGetSerialRateConfig

Statement：

bool IcdmGetSerialRateConfig(uint32 portNumber, uint32& mode, uint32& AStandard,

uint32& BStandard, uint32& AMax, uint32& BMax, uint32& Enable)

Function：

Get serial port monitor mode and parameter。

Parameter：

port Number：serial port number，for example: 1 is for COM1。

mode：monitor mode ，1、Full Tx/Rx, 2、Half Tx/Rx, 3、Tx only, 4、Rx only.

AStandard：A standard value

BStandard：B standard value

Amax：A Threshold

BMax：B Threshold

Enable：monitor function enable or disable，0: disable，1:enable
Return value：return true if success , return false if fail.

2.1.1.7 IcdmSetSerialRateConfig

Statement：
bool IcdmSetSerialRateConfig(uint32 portNumber, uint32 mode, uint32 AStandard, uint32 BStandard, uint32 AMax, uint32 BMax, uint32 Enable)
Function：
Configure the ECU Serial Port monitor mode and parameter。
Parameter：
Port Number：serial port number，for example: 1 is COM1。
mode：monitor mode : 1、Full Tx/Rx, 2、Half Tx/Rx, 3、Tx only, 4、Rx only.
AStandard：A standard value
BStandard：B standard value
Amax：A Threshold
BMax：B Threshold
Enable：monitor enable or disable ，0: disable，1: enable
Return Value：return true if success , return false if failure

2.1.1.8 IcdmGetLANPortCount

Statement：
uint IcdmGetLANPortCount();
Function：Get the LAN Count of ECU
Parameter：Null
Return value：LAN Port number of ECU

2.1.1.9 IcdmGetLANLinkStatus

Statement：
bool IcdmGetLANLinkStatus(uint portNumber);
Function：
Get the ECU LAN communication link status 。
Parameter：
portNumber：LAN number，for example: 1 means LAN1。
Return value: return true if LAN link is normal, return false if LAN Link is abnormal

2.1.1.10 IcdmGetLANLinkExceptionTime

Statement：
uint IcdmGetLANLinkExceptionTime(uint portNumber);

Function：

Get the ECU LAN Communication Link Exception time interval

Parameter：

portNumber：LAN number，for example: 1 meanse LAN1。

Return value：

LAN Communication link time interval of ECU（ms）。

2.1.1.11 IcdmGetLANCommStatus

Statement：

bool IcdmGetLANCommStatus(uint portNumber);

Function：

Get ECU LAN Communication status

Parameter：

port Number：LAN Port number，for example: 1 menase LAN1。

Return Value：

Return true if LAN communication normal；else return false。

2.1.1.12 IcdmGetLANCommExceptionTime

Statement：

uint IcdmGetLANCommExceptionTime(uint portNumber);

Function：

Get the ECU LAN communication abnormal status time interval

Parameter：

Port Number：LAN Port number，for example: 1 : LAN1。

Return value：ECU abnormal communication time interval of ECU LAN(ms)

2.1.1.13 IcdmGetLANInfo

Statement：

bool IcdmGetLANInfo(uint32 portNumber, uint32 &ElapsedOfLastActive,uint8 &LinkSpeed, uint8 &PhyiscLinkStatus);

Function：

Get ECU LAN data communication status

Parameter：

portNumber：LAN Number ，for example : 1 mease LAN1。

ElapsedOfLastActive：last active time interval

LinkSpeed：link mode : 0xa3 10M，0xa1 1000M, 0xa0 100M

PhyiscLinkStatus：link status ，0: no link，1: link

Return value：

Return true if success , return false if failure

2.1.1.14 IcdmGetLANRateConfig

Statement：

bool IcdmGetLANRateConfig (uint32 portNumber, uint32& mode, uint32& AStandard,

uint32& BStandard, uint32& AMax, uint32& BMax, uint32& Enable)

Function：

Get the ECU LAN port’s monitor mode and parameter。

Parameter：

portNumber：Lan Port number，for example:1 meanse LAN1。

mode：monitor mode , 1、Full Tx/Rx,.

AStandard：A standard value

BStandard：B standard value

Amax：A Threshold

BMax：B Threshold

Enable：enable or disable monitor mode : 0: disable，1: enable

Return Value：return true if success , return false if failure

2.1.1.15 IcdmSetLANRateConfig

Statement：

bool IcdmSetLANRateConfig (uint32 portNumber, uint32 mode, uint32 AStandard, uint32 BStandard, uint32 AMax, uint32 BMax, uint32 Enable)

Function：

Configure ECU LAN monitor mode and parameter：

portNumber：serial port number，for example: 1: LAN1。

mode：monitor mode: 1、Full Tx/Rx.

AStandard：A standard

BStandard：B standard

Amax：A threshold

BMax：B threshold

Enable：enable or disable monitor function，0: disable，1: enable.

Return value：return true if success , return false if failure

2.1.1.16 IcdmGetAllRate

Statement：

bool ICDMAPI IcdmGetAllRate(unsigned char *pSerialRate,uint32 serialCount,unsigned char *pLanRate,uint32 lanCount);

Function：

Get the ECU serial port rating result

Parameter：

pSerialRate：store the serial rating buffer，the buffer should keep the same

with real serial port number。

serialCount：serial port number

pLanRate： store LAN port rating result buffer，the strength must be the same with LAN Port number。

lanCount：LAN Port number

Return value：return true if success , return false if failure

2.1.1.22.1.1.17 IcdmFWUpdate

Statement：

int IcdmFWUpdate(char* fileName);

Function：

Update Firmware

Parameter：

filename : Firmware file full path name

Return value：update Firmware result , 0 : success 。

2.1.2 Data structure and data type

```
enum CommDataType {
    SEND = 0,
    RECEIVE,
};
```

2.1.3 API call process

2.1.3.1 Get serial port communication status

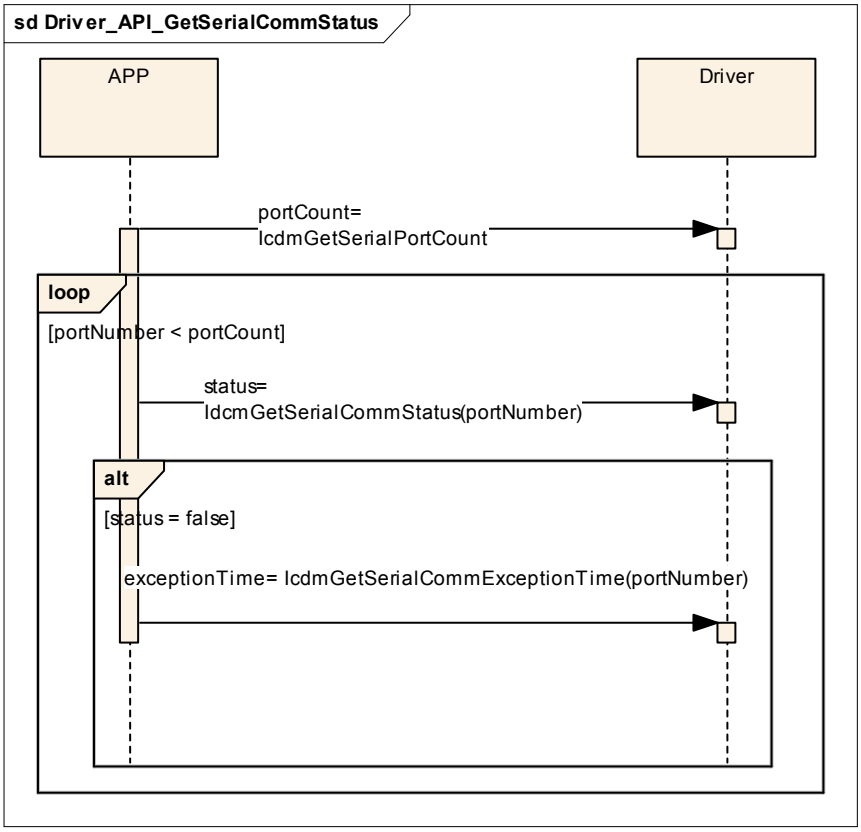


Figure 2 :Get serial port communication timing chart

2.1.3.2 Get serial port sending and receiving time interval

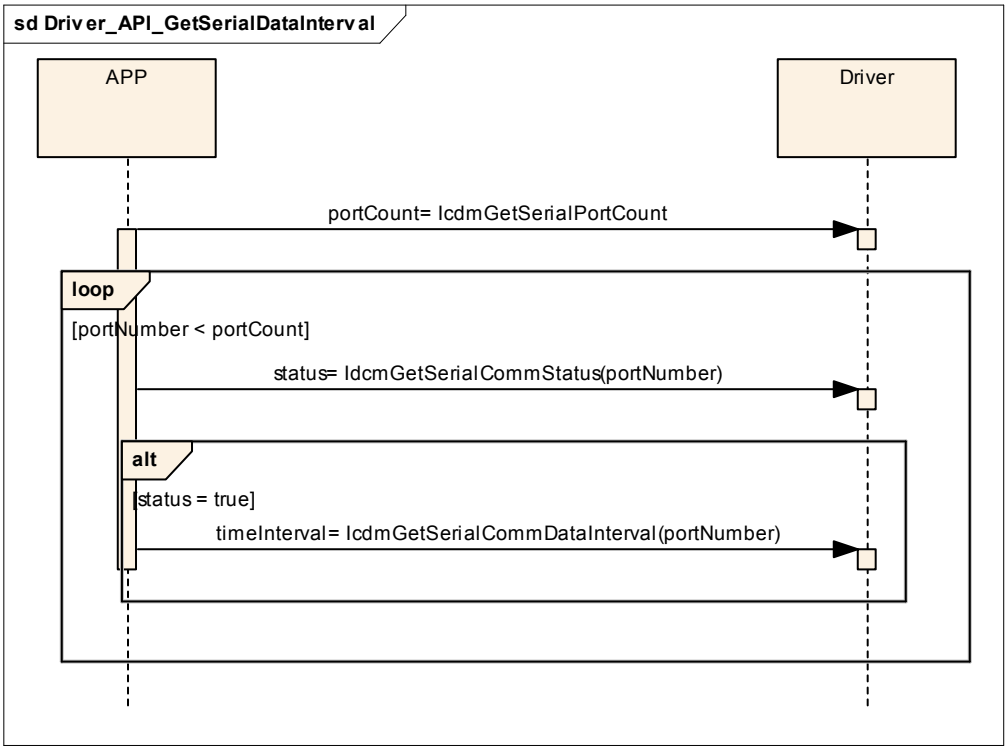


Figure 3 :Get serial port sending and receiving data time interval timing chart

2.1.3.3 Get LAN Port Communication Link Status

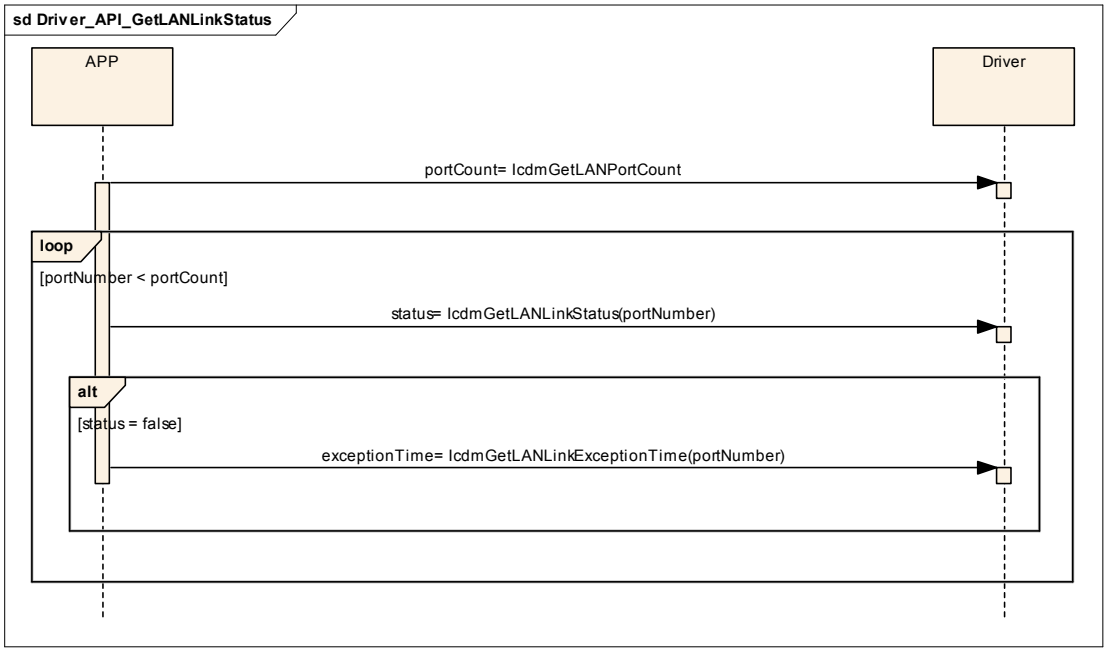


Figure 4: Get LAN communication link status timing chart

2.1.3.4 Get LAN data communication status

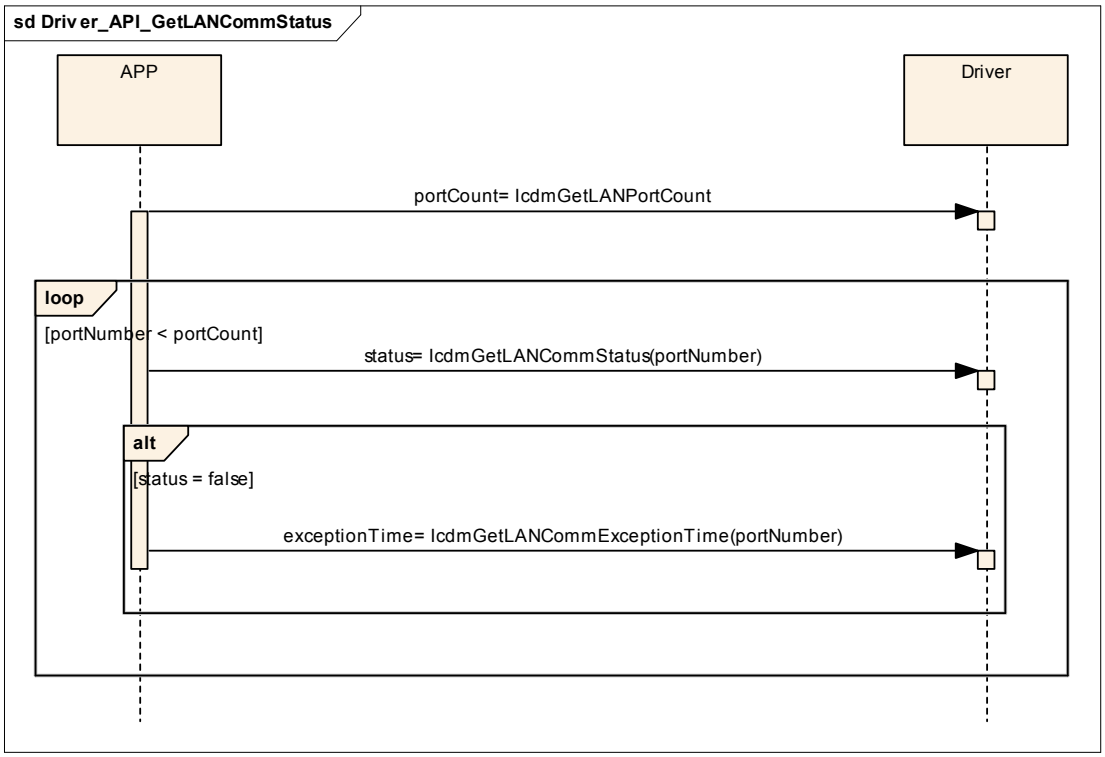


Figure 5 :Get LAN data communication status timing Chart